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09/856,468	06/07/2001	Takaaki Hirai	107176-00006	6366

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EXAMINER

CHANG, VICTOR S

ART UNIT PAPER NUMBER

1771

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**BEFORE THE BOARD OF PATENT APPEALS  
AND INTERFERENCES**

Application Number: 09/856,468  
Filing Date: June 07, 2001  
Appellant(s): HIRAI ET AL.

\_\_\_\_\_  
David Nikaido and Robert Green  
For Appellant

**EXAMINER'S ANSWER**

This is in response to the appeal brief filed 11/4/2004.

**(1) Real Party in Interest**

A statement identifying the real party in interest is contained in the brief.

**(2) Related Appeals and Interferences**

A statement identifying the related appeals and interferences which will directly affect or be directly affected by or have a bearing on the decision in the pending appeal is contained in the brief.

**(3) Status of Claims**

The statement of the status of the claims contained in the brief is correct.

**(4) Status of Amendments After Final**

The appellant's statement of the status of amendments after final rejection contained in the brief is correct.

**(5) Summary of Invention**

The summary of invention contained in the brief is correct.

**(6) Grounds of Rejection Presented for Appeal**

The appellant's statement of the grounds of rejection in the brief is correct.

**(7) Claims Appealed**

The copy of the appealed claims contained in the Appendix to the brief is correct.

**(8) Prior Art of Record**

JP 08-174590	Shinto et al.	7-1996
US 5,475,037	Park et al.	12-1995

**(9) Grounds of Rejection**

The following ground(s) of rejection are applicable to the appealed claims:

Art Unit: 1771

Claims 1, 3-8 and 10-20 are rejected under 35 U.S.C. 103(a) as being unpatentable over JP 08-174590 (computer translation) in view of Park (US 5475037).

JP '590 is directed to preparing pre-expanded particles of a thermoplastic polyester resin and bonding (i.e., molding) together pre-expanded particles to form an expanded (i.e., foamed) material with a bulk density of 0.02-0.7 g/cm<sup>3</sup>. The pre-expanded particles are prepared by melting the thermoplastic polyester resin containing a foaming agent by means of an extruder to effect extrusion foaming, following which the extruded foam material is cut, in which the crystallinity of 25% or less is maintained (Abstract). JP '590 expressly teaches that a reduced crystallinity of pre-expanded particles is required to obtain good weld (fusion) between the particles during molding (paragraph [0008]). Finally, in an Example, JP '590 teaches that the bulk density of the pre-expanded particles is 0.2 g/cm<sup>3</sup>, and has a crystallinity of 10%, prior to molding (paragraph [0018]).

For claim 1, it is noted that JP '590 expressly teaches pre-expanded particles having a low crystallinity of 25% or less and bulk density of the pre-expanded particles is 0.2 g/cm<sup>3</sup>, as set forth above, which reads on the instantly claimed crystallinity of 1-8% and bulk density of 0.01 to 1.0 g/cm<sup>3</sup> for the pre-expanded foam particles. While JP '590 is silent about the exact composition of the polyester resin used for forming the pre-expanded particles, and its crystallization peak temperature, JP '590 does teach that various monomers, including isophthalic acid and cyclohexanedimethanol, etc., can be included for forming the polyester resin (paragraph [0015]). Further, it is noted that Park's invention is directed to a low density foam of amorphous polyethylene

Art Unit: 1771

terephthalate copolymer (Abstract). Park teaches that polyethylene terephthalate (PET) is typically a crystalline polymer (typical crystallization half-time is less than 10 second), and his invention employs an amorphous PET which either does not crystallize or has a crystallization half-time longer than about one hour (i.e., crystallizes very slowly) (column 2, lines 40-54). Park also expressly teaches that generally amorphous polyester resins may be produced by introducing irregularity in the polymer chains. Such irregularity may be introduced in the molecular chains by utilizing and effecting polymerization in the presence of a plurality of diacids, diols, or both, such as isophthalic acid, cyclohexanedimethanol, or mixtures of both. Generally, amorphous polyesters are produced by the incorporation of relatively large amounts (about 15% to about 50%) of isophthalic acid or cyclohexanedimethanol or both in the polymeric structure (column 2, line 59 to column 3, line 16). The Examiner notes that Park's teaching clearly shows that irregularity in the polymer chain disrupts structural regularity required for crystallinity, and since Park expressly teaches that greater than 15% co-monomers is required to impart amorphous property, Park implicitly teaches that when the amount of co-monomers (isophthalic acid or cyclohexanedimethanol) is less than 15%, the crystallinity of PET is reduced by structural irregularity in polymer chains (i.e., reduced crystallinity), but not to the degree of being fully amorphous. As such, in the absence of unexpected results, it would have been obvious to one skilled in the art of polyester foams to select an aromatic copolyester resin of low crystallinity by incorporating a suitable small amount (less than 15%) of isophthalic acid and/or cyclohexanedimethanol co-monomers, as implicitly taught by Park, motivated by the

Art Unit: 1771

desire to obtain a pre-expanded foam particle with a reduced crystallinity of less than 25%, as taught by JP '590. As to the crystallization peak temperature, in the absence of evidence to the contrary, it is the Examiner's position that the aforementioned property is either inherent or obviously provided, once a suitable copolyester composition with reduced crystallinity is selected. Additionally, the Examiner notes that Applicants' have admitted that "The crystallization peak temperature is a function of the materials" (Appeal Brief, page 11, top paragraph).

For claim 3, the Examiner notes that the common knowledge or well-known in the art statement (incorporating small amount of polytetrafluoroethylene particulates as a foam nucleating agent is old and well known, as evidenced by the state of the art Allen et al. (US 4683247) which teaches the use of polytetrafluoroethylene particulates as a foam nucleating agent (column 1, lines 51-55) is taken to be admitted prior art because Applicants failed to traverse the Examiner's assertion of official notice.

For claims 4 and 5, JP '590 teaches that the extrudate was cut into pre-expanded foam particles as set forth above. Further, JP '590 teaches that the various foam shapes, such as a rod-like, tabular, sheet-like, etc., can be made (paragraphs [0006] and [0007]).

For claim 6, while JP '590 is silent about the melt tension of the crystalline aromatic polyester resin, since JP '590 teaches substantially the same subject matter as the instant invention, it is the Examiner's position that, in the absence of unexpected results, a suitable melt tension of the crystalline aromatic polyester resin is an obvious optimization to one of ordinary skill in the art of polyester foaming. It should be noted

Art Unit: 1771

that where the claimed and prior art products are shown to be identical or substantially identical in structure or composition, or are produced by identical or substantially identical processes, a *prima facie* case of either anticipation or obviousness has been established. See MPEP § 2112.01.

Similarly, for claim 7, in the absence of unexpected results, it is the examiner's position that an open cell ratio in the range of from 5 to 35% is either inherent or obviously provided, once the product is made. For example, in Example 2 of Park reference, expanded foams with an open cell content of 7% is obtained (column 7, line 3).

For claim 8, JP '590 teaches that it is a common practice to carry out a post expansion of the pre-expanded particles by pressure treatment (paragraph [0013]).

For claim 10, JP '590 teaches that a polyester foam molding is obtained by filling up a metal mold with pre-expanded foam particles, carry out further heat expansion (paragraph [0002]).

For claim 11, JP '590 teaches that the bulk density of a molded foam is 0.02-0.7 g/cm<sup>3</sup>. As to the fusion ratio, in the absence of unexpected results, it is again the Examiner's position that since JP '590 teaches substantially the same foaming and molding processes as the instant claimed invention, a suitable range of fusion ratio is an obvious optimization to one skilled in the art, motivated by the desire to obtain a well fused molded foam article.

For claims 12 and 13, the Examiner notes that the common knowledge or well-known in the art statement (it is believed that molding a foamed article with a layer of

Art Unit: 1771

film or sheet as a skin layer is old and well known. Further, in the absence of unexpected results, it would have been obvious to one of ordinary skill in the art to mold the article with a suitable amount peel strength between the foam core and the skin layer, motivated by the desire to obtain a durable molded composite foam article) in the prior Office action (see Office action dated 4/2/2003, page 6) is taken to be admitted prior art because Applicants failed to traverse the Examiner's assertion of official notice.

For the product-by-process claims 14, 18 and 20, the Examiner notes that Applicant must show that the resultant article is patentably distinct from those taught by the reference. Therefore, these limitations at the present time have not been given patentable weight.

For claims 15, 16, 17 and 19, they repeat the same subject matter of claims 3 and 5; claims 15 and 6; claims 16 and 8; and claims 18 and 11, respectively, and as such they are also rejected, as set forth above.

**(10) *Response to Argument***

With respect to Appellants' argument "The Office Action acknowledges that JP '590 does not disclose, teach or suggest a prefoamed product having a crystallinity lower than 8.5% ... The Office Action makes no representation that Park et al. '037 makes up for this deficiency" (Appeal Brief, page 6, second paragraph), the Examiner repeats, as set forth above, that while JP '590 is silent about the exact composition of the polyester resin used for forming the pre-expanded particles, JP '590 does teach that various monomers, including isophthalic acid and cyclohexanedimethanol, etc., can be included for forming the polyester resin (paragraph [0015]). Further, it is noted that



Art Unit: 1771

Park's invention is directed to a low density foam of amorphous polyethylene terephthalate copolymer (Abstract). Park teaches that polyethylene terephthalate (PET) is typically a crystalline polymer (typical crystallization half-time is less than 10 second), and his invention employs an amorphous PET which either does not crystallize or has a crystallization half-time longer than about one hour (i.e., crystallizes very slowly) (column 2, lines 40-54). Park also expressly teaches that generally amorphous polyester resins may be produced by introducing irregularity in the polymer chains. Such irregularity may be introduced in the molecular chains by utilizing and effecting polymerization in the presence of a plurality of diacids, diols, or both, such as isophthalic acid, cyclohexanedimethanol, or mixtures of both. Generally, amorphous polyesters are produced by the incorporation of relatively large amounts (about 15% to about 50%) of isophthalic acid or cyclohexanedimethanol or both in the polymeric structure (column 2, line 59 to column 3, line 16). The Examiner notes that Park's teaching clearly shows that irregularity in the polymer chain disrupts structural regularity required for crystallinity, and since Park expressly teaches that greater than 15% co-monomers is required to impart amorphous property, Park implicitly teaches that when the amount of co-monomers (isophthalic acid or cyclohexanedimethanol) is less than 15%, the crystallinity of PET is reduced by structural irregularity in polymer chains (i.e., reduced crystallinity), but not to the degree of being fully amorphous. As such, in the absence of unexpected results, it would have been obvious to one skilled in the art of polyester foams to select an aromatic copolyester resin of low crystallinity by incorporating a suitable small amount (less than 15%) of isophthalic acid and/or

Art Unit: 1771

cyclohexanedimethanol co-monomers, as implicitly taught by Park, motivated by the desire to obtain a pre-expanded foam particle with a reduced crystallinity of less than 25%, as taught by JP '590, Appellants' argument to the contrary notwithstanding.

With respect to Appellants' argument "JP '590 states nothing about the co-monomer concentration, but rather teaches the range of crystallinity. Park et al. '037 discloses the amorphous polyester comprising isophthalic acid as co-monomer in a concentration of 15 to 50% ... but does not disclose, teach or suggest a crystalline polyester comprising isophthalic acid as the co-monomer in a concentration lower than 15%" (Appeal Brief, page 6, bottom paragraph), the Examiner notes that Park's teaching implicitly shows that when co-monomer concentration is less than 15%, the polyester resin is not fully amorphous, i.e., the irregularity attributed by the co-monomer only disrupts and reduces crystallinity to a degree, as set forth above.

With respect to Appellants' argument "The amorphous polyester of Park et al. '037 is not applicable to the present claimed crystalline polyester because the crystalline polyester is intrinsically different from the amorphous polyester" (Appeal Brief, page 7, first paragraph), the Examiner notes that Park's amorphous polyester is not relied upon as basis for rejection. Rather, Park's implicit teaching that the crystallinity of PET can be reduced by incorporating a small amount (less than 15%) co-monomers is the basis for rejection, Appellants' argument is irrelevant.

With respect to Appellants' arguments "The inventor declared that pre-expanded particles having a crystallinity in the range of 1 to 8% is critical. None of the cited references discloses or suggests pre-expanded particles having a crystallinity in the

Art Unit: 1771

range of 1 to 8%" (Appeal Brief, page 7, third paragraph) and "the present application teaches that the intended product produced by the present invention cannot be produced when the ranges of the IPA (isophthalic acid) or the CHDM (1,4-cyclohexanedimethanol) are outside of claimed range. This statement is, of course, evidence establishing criticality of the claimed range, and is sufficient to satisfy an obviousness rejection ..." (Appeal Brief, page 9, last full paragraph), the Examiner repeats that JP '590 expressly teaches pre-expanded particles having a low crystallinity of 25% or less, as set forth above, which reads on the instantly claimed crystallinity of 1-8%, Appellants' argument to the contrary notwithstanding.

With respect to Appellants' argument "Park et al. '037 requires amorphous polyester, which is impossible to produce when the claimed range of 0.5 to 10% by weight of a moiety of isophthalic acid is used ... Park et al. '037 teaches away from this modification" (Appeal Brief, page 10, second full paragraph), the Examiner repeats that Park's amorphous polyester is not relied upon as basis for rejection. Rather, Park's implicit teaching that the crystallinity of PET can be reduced by incorporating a small amount (less than 15%) co-monomers is the basis for prior rejection, as set forth above, Appellants' argument is irrelevant and misdirected.

With respect to Appellants' argument "JP '590 ... makes no mention of the bulk density of the pre-expanded particles" (Appeal Brief, page 10, last full paragraph), the Examiner repeats, as set forth above, that in an Example, JP '590 teaches that the bulk density of the pre-expanded particles is 0.2 g/cm<sup>3</sup>, which reads on the instantly

Art Unit: 1771

claimed bulk density of 0.01 to 1.0 g/cm<sup>3</sup> for the pre-expanded foam particles, prior to molding (paragraph [0018]).

With respect to Appellants' argument "The crystallization peak temperature is a function of the materials ... Applicants note that JP '590 (paragraph 0015) teaches that compounds such as isophthalic acid and cyclohexane dimethanol can be included to obtain the resin that forms the expanded material. However, JP '590 fails to teach that these compounds merely form a minor part of the resin ... the person of ordinary skill in the art would not be motivated to form a resin material having claimed crystallization peak temperature in light of the deficient teachings of JP '590" (Appeal Brief, page 11, top paragraph), the Examiner notes that, first, Appellants appear to have admitted that the crystallization temperature is a function of the material, i.e., it is either inherent or obviously provided, once a suitable polyester composition is selected. Second, Appellants clearly argues the references individually. In response to Applicant's argument, it is asserted that one cannot show non-obviousness by attacking references individually where the rejections are based on combinations of references. It should be noted that the rejection is based on the combined teachings of JP '590 and Park, and Park implicitly teaches the suitable amount (less than 15%) of co-monomers in the polyester resin, as set forth above.

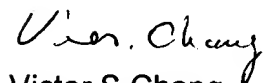
Finally, with respect to Appellants' argument "both JP '590 and Park et al. '037 do not disclose, teach or suggest that pre-expanded particles have a crystallinity in the claimed range of 1 to 8%. The alleged knowledge of how to modify crystallinity does not disclose, teach or suggest the range of desired crystallinity of pre-expanded

Art Unit: 1771



particles" (Appeal Brief, page 11, bottom paragraph), the Examiner repeats that JP '590 does expressly teach that in order to obtain a good fusion between the particles during molding, the pre-expanded particles have a low crystallinity of 25% or less, as set forth above, which reads on the instantly claimed crystallinity of 1-8%. Further, Park implicitly teaches that when co-monomer concentration is less than 15%, the polyester resin is not fully amorphous, i.e., the irregularity attributed by the co-monomer only disrupts and reduces crystallinity to a degree, as set forth above, Appellants' argument to the contrary notwithstanding.

For the above reasons, it is believed that the rejections should be sustained.


Respectfully submitted,

  
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Art Unit 1771

January 10, 2005

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